Amendments to the Claims

1. (Currently Amended) A method for producing an image of a subject with a magnetic resonance imaging (MRI) system, the steps comprising

a) acquiring a first k-space data set with the MRI system using a first pulse sequence;

b) acquiring a second k-space data set with the MRI system using a second pulse sequence which is different from the first pulse sequence;

c) reconstructing first and second complex images of the subject from the respective first and second k-space data sets;

d) calculating a phase difference image from the first and second complex images;

e) calculating a magnitude image from one of said first or second complex images; and

~~f) combining the phase difference image with the magnitude image to form the image of the subject~~

f) employing the phase difference image to locate an implant in the subject; and

g) displaying the location of the implant in the magnitude image.

2. (Original) The method as recited in claim 1 in which said first pulse sequence is a spin-echo pulse sequence in which an NMR echo signal is produced after an RF refocusing pulse is produced, and the second pulse sequence is a gradient-recalled echo pulse sequence in which an NMR echo signal is produced after an RF excitation pulse is produced.

3. (Original) The method as recited in claim 1 in which step c) is performed by performing a complex Fourier transformation of each of the first and second k-space data sets.

4. (Original) The method as recited in claim 1 in which step d) is performed by:

i) calculating a first phase image from the first complex image;

ii) calculating a second phase image from the second complex image;

iii) calculating the phase difference image by computing the phase difference between corresponding pixels in the first and second phase images.

5. (Canceled) The method as recited in claim 1 in which step f) is performed by: employing the phase difference image to locate an implant in the subject; and displaying the location of the implant in the magnitude image.

6. (Original) The method as recited in claim 1 in which the subject is tissues containing an implant.

7. (Original) The method as recited in claim 6 in which the tissues include a human prostate and the implant is a brachytherapy seed.

8. (Original) A method for producing an image of tissues containing an implant with a magnetic resonance imaging (MRI) system, the steps comprising:

a) acquiring first and second k-space data sets with the MRI system by performing a series of pulse sequences which acquire a set of NMR spin-echo signals for the first k-space data set and a set of NMR gradient-recalled echo signals for the second k-space data set;

b) reconstructing first and second complex images of the tissues containing the implant from the respective first and second k-space data sets;

c) calculating a phase difference image from the first and second complex images;

d) calculating a magnitude image using data from said first or second complex images; and

e) employing the phase difference image to display the location of the implant in the magnitude image to form the image.

9. (Original) The method as recited in claim 8 in which step b) is performed by performing a complex Fourier transformation of each of the first and second k-space data sets.

10. (Original) The method as recited in claim 8 in which step a) is performed by:

i) performing a first pulse sequence to acquire the NMR spin-echo signals; and

ii) performing a different pulse sequence to acquire the NMR gradient-recalled signals.

11. (Original) The method as recited in claim 10 in which one NMR signal is acquired with each pulse sequence.

12. (Original) The method as recited in claim 8 in which step c) is performed by:

i) calculating a first phase image from the first complex image;

ii) calculating a second phase image from the second complex image;

iii) calculating the phase difference image by computing the phase difference between corresponding pixels in the first and second phase images.

13. (Original) The method as recited in claim 8 in which the tissues include a human prostate and the implant is a brachytherapy seed.

14. (Original) The method as recited in claim 8 in which the implant is formed of titanium.

15. (Original) A method for producing an image of tissues containing an implant with a magnetic resonance imaging (MRI) system; the steps comprising:

a) acquiring a complex k-space data set with the MRI system using a pulse sequence;

b) reconstructing a complex image by Fourier transforming the complex k-space data set;

c) calculating a phase image from the complex image;

d) calculating a magnitude image from the complex image;

e) locating the implant in the tissues using information in the phase image; and

f) displaying the location of the implant in the magnitude image.

16. (Original) The method as recited in claim 15 in which step f) is performed by modifying pixels in the magnitude image at the implant location.

17. (Original) The method as recited in claim 15 in which step f) is performed by overlaying a graphical representation of the implant at the implant location.

18. (Original) The method as recited in claim 15 in which the tissues include a human prostate and the implant is a brachytherapy seed.

19. (New) A method for producing an image of a subject with a magnetic resonance imaging (MRI) system, the steps comprising

a) acquiring a first k-space data set with the MRI system using a spin-echo pulse sequence;

b) acquiring a second k-space data set with the MRI system using a gradient-recalled echo pulse sequence;

c) reconstructing first and second complex images of the subject from the respective first and second k-space data sets;

d) calculating a phase difference image from the first and second complex images;

e) calculating a magnitude image from one of said first or second complex images; and

f) combining the phase difference image with the magnitude image to form the image of the subject.